

Quantifiable and Reliable Structural Health Management Systems, Phase I

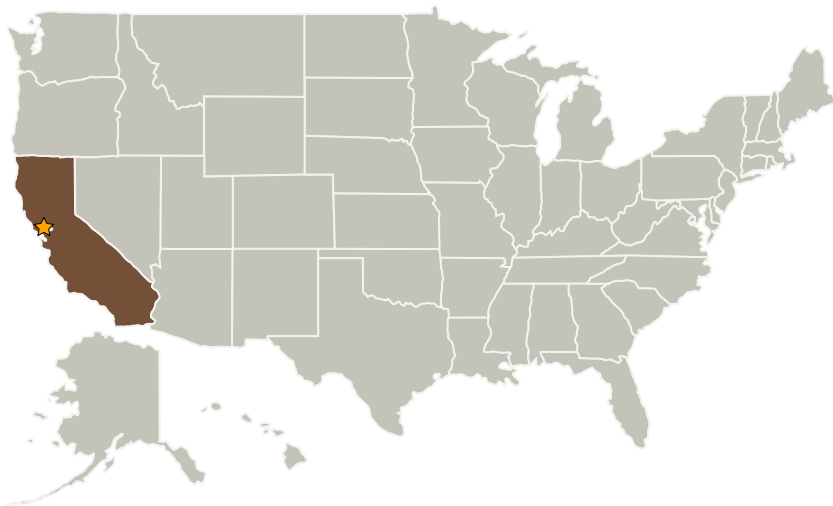
Completed Technology Project (2008 - 2008)



Project Introduction

Major concerns for implementing a practical built-in structural health monitoring system are prediction accuracy and data reliability. It is proposed to develop robust state-of-the-art structural health management (SHM) technologies to overcome these concerns. The proposed solution will be capable of detecting and quantifying damage with a high probability of detection (POD), accurately predicting the residual strength and remaining life of the structures with confidence, and providing information which will allow appropriate preventative actions on the monitored structure. To achieve the objectives the proposed technology will first optimize the sensor network configuration for the SHM system to achieve the highest probability of detection. Next, robust diagnostic techniques will be developed to achieve quantifiable damage location and size estimation that account for the uncertainties induced by the environments or the system itself continuously during flight or at scheduled maintenance intervals. Finally, efficient probabilistic prognostic methods will be integrated with diagnostic outputs to provide real time estimation of residual strength and remaining life of the damaged structure. Both metallic and composite stiffened aircraft panels will be instrumented and tested under simulated flight conditions to validate the proposed technology. The work will be performed collaboratively between Acellent and Stanford University.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission
Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Small Business Innovation
Research/Small Business Tech
Transfer

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Organizations Performing Work	Role	Type	Location
★ Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
Acellent Technologies, Inc.	Supporting Organization	Industry Small Disadvantaged Business (SDB), Women-Owned Small Business (WOSB)	Sunnyvale, California

Primary U.S. Work Locations

California

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Shawn Beard

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
 - └ TX12.2 Structures
 - └ TX12.2.3 Reliability and Sustainment